California Department of Transportation
Division of Maintenance

Structure Maintenance and Investigations

BRIDGE

INSPECTION

RECORDS

INFORMATION

SYSTEM

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DEPARTMENT OF TRANSPORTATION
Structure Maintenance & Investigations

Bridge Number : 27 0023
Facility Carried: STATE ROUTE 1
Location : 04-MRN-001-28.51
City :
Inspection Date : 05/07/2014
Inspection Type
Routine FC Underwater Special Other
X

Bridge Inspection Report

STRUCTURE NAME: LAGUNITAS CREEK

CONSTRUCTION INFORMATION

Year Built : 1929
Year Widened: N/A
Length (m) : 46.3
Skew (degrees): 0
No. of Joints : 2
No. of Hinges : 0

Structure Description: RC deck on riveted steel floor beams on riveted steel pony truss main span and RC T-beam (5) end spans on RC piers and RC abutments. The piers are founded on piles and the abutments are founded on spread footings.

Span Configuration : 1 @ 7.32 m, 1 @ 30.48 m, 1 @ 7.32 m

SAFE LOAD CAPACITY AND RATINGS

Design Live Load: MS-13.5 OR HS-15
Inventory Rating: RF=0.67 =>21.7 metric tons Calculation Method: ALLOWABLE STRESS
Operating Rating: RF=1.11 =>36.0 metric tons Calculation Method: ALLOWABLE STRESS
Permit Rating : XXXXX
Posting Load : Type 3: Legal Type 3S2: Legal Type 3-3: Legal

DESCRIPTION ON STRUCTURE

Deck X-Section: 1.2 m sw, 0.21 m cu, 7.32 m, 0.21 m cu
Total Width: 8.8 m Net Width: 7.3 m No. of Lanes: 2 Speed: 35 mph
Min. Vertical Clearance: Unimpaired

Rail Code: 0000

Rail Type	Location	Length (ft)	Rail Modifications
Misc. Steel	Right/Left	306	

DESCRIPTION UNDER STRUCTURE

Channel Description: Sandy silt.

INSPECTION COMMENTARY

SCOPE AND ACCESS
The river was flowing under Span 2 only at the time of the inspection. Both abutments and Pier 2 were out of water. The substructure could not be inspected under Pier 3 due to the substantial depth of the water in Span 2 side. All other substructure elements were inspected. The inspection for the superstructure was limited to the deck, rails and left steel truss from the left sidewalk.

A fracture critical inspection dated 10/24/2013 was conducted in accordance with the Fracture Critical Member Inspection Plan. This bridge is fracture critical because it is a truss with low redundancy. It also has riveted connection and Category D detail on tension chord.

DECK AND ROADWAY
There are new AC approach pavements to both abutments.

The original steel sliding expansion joints at the abutments have been cut and removed to modify them as open expansion joints. However, at the time of this inspection and

INSPECTION COMMENTARY

temperature of 70 degree Fahrenheit, there was no gap between the open expansion joints on either abutment (see 5/24/2012 archived photos).

The RC deck of the approach spans in Spans 1 and 3 have 1/16 inch wide longitudinal and diagonal cracks which were treated with methacrylate in 2014 under Contract 04-04H820.

The RC deck of the steel truss span in Span 2 has 1/32 inches wide longitudinal, transverse, and pattern cracks which were treated with methacrylate in 2011 under Contract 04-0E9801.

The steel bridge rails facing traffic have moderate rust and are spotted with fungus growth. Some of the riveted connections on the rails have up to 1/3 inches of pack rust under them.

There is a 2 feet X 1 feet opening on the timber flooring at the left sidewalk where it meets left steel truss near Pier 3 (see 5/12/2012 archived photos). A work recommendation is proposed to close the hole.

SUPERSTRUCTURE

Some of the steel gusset plates connecting the bridge rails to the vertical truss members have up to 1/4 inches of pack rust at each corner of the plate.

There is up to 1/4 inches of pack rust between the corners of the steel gusset plates and the bottom chord of the steel truss (see 10/27/2010 archived photos).

The steel gusset plate connections at L4 left and right have pack rust up to 1.5 inches of expansion visible between plates. The pack rust has been painted over, however, the paint is beginning to fail leaving a 1/4 inches open gap (see 5/24/2012 archived photos).

The top chord of both steel trusses has a few areas of spot rust and up to 1/8 inch of pack rust found mainly at the edges of the gusset plate connections.

There are randomly spaced 1/32 inch wide vertical cracks in the RC beams in the approach spans.

There is a 6 inches x 6 inches x 4 inches triangular spall in the bottom corner of the RC slab, where the slab meets the steel floor beam, at the eighth panel point on the right side of the structure.

There are 1/32 inch wide pattern cracks in the RC soffit throughout the steel truss portion of the structure. There is a 36 inches longitudinal soffit crack about between the first and second floor beam that is beginning to spall. There is also a 48 inches x 16 inches spall with one exposed longitudinal rebar in the left side of the RC soffit in Bay 5.

There is up to 1/2 inch of pack rust along the top flanges of the steel floor beams where they meet the RC slab.

The steel lateral braces in Bays 4 and 6 are bent. This deformation was most likely caused by the forces of flood waters and the lodging of drift between the floor beams and the bracing.

There is one corroded rivet head at the left floor beam connection in Bay 6.

SUBSTRUCTURE

There is a 1/64 inch wide and 3 feet long diagonal crack in Bent 3 (right) under the

INSPECTION COMMENTARY

steel truss supporting point (see 5/24/2012 archived photos).

The Abutment 4 wall and the soffit of Span 3 are covered with graffiti, however, it is not in public view.

The timber fenders at Piers 2 and 3 have decayed and are deteriorating (see attached photo 1).

The bolts on the steel fixed bearings are rusty and bent toward Abutment 1 at an angle of about 30 degrees.

The steel rocker bearings are tilted toward Abutment 4 at an angle of approximately 30 degrees. They appear to be in good working condition (see 5/11/2010 archived photos).

The paint on the steel truss members, floor beams, lateral braces and bearings has some faded and chalky areas, as well as occasional surface and edge rust. Pack rust is present at some of the connections.

SAFE LOAD CAPACITY
A Load Rating Summary Sheet dated 6/30/2010 is on file for this structure. The load rating for this structure is being reviewed by SMI Ratings Branch. An updated Load Rating Summary will be archived when this review is complete. The current rating is based on Working Stress method dated 8/23/1978.

STEEL INVESTIGATIONS

This structure qualifies for an in-depth Steel investigation because it possesses the following fracture critical or fatigue prone details :

Floor Beams: FC Members,
Truss: FC Members

Fracture Critical: Yes Inspection Freq.: 24 Next Inspection: 10/24/2015

ELEMENT INSPECTION RATINGS

Elem No.	Element Description	Env	Total Qty	Units	Qty in each Condition State St. 1	St. 2	St. 3	St. 4	St. 5
12	Concrete Deck - Bare	2	408	sq.m	408	0	0	0	0
121	Painted Steel Bottom Chord Thru Truss	2	30	m.	0	20	10	0	0
126	Painted Steel Thru Truss (excl. bottom chord)	2	61	m.	36	15	10	0	0
152	Painted Steel Floor Beam	2	85	m.	0	0	85	0	0
227	Reinforced Conc Submerged Pile	2	1	ea.	1	0	0	0	0
304	Open Expansion Joint	2	18	m.	0	18	0	0	0
311	Moveable Bearing (roller, sliding, etc.)	2	2	ea.	2	0	0	0	0
313	Fixed Bearing	2	2	ea.	1	1	0	0	0
330	Metal Bridge Railing - coated or uncoated	2	93	m.	0	83	10	0	0
357	Pack Rust	2	1	ea.	0	1	0	0	0
358	Deck Cracking	2	1	ea.	1	0	0	0	
359	Soffit of Concrete Deck or Slab	2	1	ea.	0	1	0	0	0

WORK RECOMMENDATIONS

WORK RECOMMENDATIONS

RecDate: 05/07/2014	EstCost:	$2,600	Close the hole on the timber flooring at
Action : Deck-Repair Potholes	StrTarget:	2 YEARS	the left sidewalk where it meets left
Work By: BRIDGE CREW	DistTarget:		steel truss near Pier 3.
Status : PROPOSED	EA:		
RecDate: 05/21/2012	EstCost:	$1,500	Methacrylate both approach spans to fill
Action : Deck-Methacrylate	StrTarget:	2 YEARS	the cracks and extend the service life of
Work By: MAINT. CONTRACT	DistTarget:		the deck.
Status : PROGRAMMED	EA:	4H820	
RecDate: 05/11/2010	EstCost:	$380,800	Paint all steel elements of the bridge.
Action : Paint-Full Prep	StrTarget:	2 YEARS	Steel members have faded and there are
Work By: MAINT. CONTRACT	DistTarget:		edge rust and pack rust present at the
Status : INITIATED	EA:	0G642	connections.
RecDate: 03/28/2007	EstCost:	$205,000	Steel truss members may require
Action : Seismic-Retrofit	StrTarget:	2 YEARS	strengthening. Priority 4. Final Score
Work By: STRAIN	DistTarget:		1.75.
Status : INITIATED	EA:	0G642	
RecDate: 02/10/1984	EstCost:	$191,880	F1-06 / F2-0 / F3-5 / Rail Type-SR
Action : Railing-Upgrade	StrTarget:	2 YEARS	
Work By: STRAIN	DistTarget:		
Status : INITIATED	EA:	0G642	

Team Leader : Beau Trinh

Report Author : Beau Trinh

Inspected By : B.Trinh/T.Le

7/24/14

Beau Trinh (Registered Civil Engineer) (Date)

STRUCTURE INVENTORY AND APPRAISAL REPORT

********** IDENTIFICATION **********

(1)	STATE NAME- CALIFORNIA	069
(8)	STRUCTURE NUMBER	27 0023
(5)	INVENTORY ROUTE(ON/UNDER)- ON	131000010
(2)	HIGHWAY AGENCY DISTRICT	04
(3)	COUNTY CODE 041 (4) PLACE CODE	00000
(6)	FEATURE INTERSECTED-	LAGUNITAS CREEK
(7)	FACILITY CARRIED-	STATE ROUTE 1
(9)	LOCATION-	04-MRN-001-28.51
(11)	MILEPOINT/KILOMETERPOINT	28.51
(12)	BASE HIGHWAY NETWORK- PART OF NET	1
(13)	LRS INVENTORY ROUTE & SUBROUTE	000000000101
(16)	LATITUDE	38 DEG 03 MIN 52.41 SEC
(17)	LONGITUDE	122 DEG 48 MIN 18.46 SEC
(98)	BORDER BRIDGE STATE CODE % SHARE	%
(99)	BORDER BRIDGE STRUCTURE NUMBER	

******** STRUCTURE TYPE AND MATERIAL *********

(43)	STRUCTURE TYPE MAIN:MATERIAL-	STEEL
	TYPE- TRUSS - THRU	CODE 310
(44)	STRUCTURE TYPE APPR:MATERIAL-	CONCRETE
	TYPE- TEE BEAM	CODE 104
(45)	NUMBER OF SPANS IN MAIN UNIT	1
(46)	NUMBER OF APPROACH SPANS	2
(107)	DECK STRUCTURE TYPE- CIP CONCRETE	CODE 1
(108)	WEARING SURFACE / PROTECTIVE SYSTEM:	
	A) TYPE OF WEARING SURFACE- NONE	CODE 0
	B) TYPE OF MEMBRANE- NONE	CODE 0
	C) TYPE OF DECK PROTECTION- NONE	CODE 0

*********** AGE AND SERVICE ***********

(27)	YEAR BUILT	1929
(106)	YEAR RECONSTRUCTED	0000
(42)	TYPE OF SERVICE: ON- HIGHWAY-PEDESTRIAN	5
	UNDER- WATERWAY	5
(28)	LANES:ON STRUCTURE 02 UNDER STRUCTURE	00
(29)	AVERAGE DAILY TRAFFIC	3000
(30)	YEAR OF ADT 2009 (109) TRUCK ADT	4 %
(19)	BYPASS, DETOUR LENGTH	10 KM

********** GEOMETRIC DATA **********

(48)	LENGTH OF MAXIMUM SPAN	30.5 M
(49)	STRUCTURE LENGTH	46.3 M
(50)	CURB OR SIDEWALK: LEFT 1.2 M	RIGHT 0.2 M
(51)	BRIDGE ROADWAY WIDTH CURB TO CURB	7.3 M
(52)	DECK WIDTH OUT TO OUT	8.8 M
(32)	APPROACH ROADWAY WIDTH (W/SHOULDERS)	6.7 M
(33)	BRIDGE MEDIAN- NO MEDIAN	0
(34)	SKEW 0 DEG (35) STRUCTURE FLARED	NO
(10)	INVENTORY ROUTE MIN VERT CLEAR	99.99 M
(47)	INVENTORY ROUTE TOTAL HORIZ CLEAR	7.3 M
(53)	MIN VERT CLEAR OVER BRIDGE RDWY	99.99 M
(54)	MIN VERT UNDERCLEAR REF- NOT H/RR	0.00 M
(55)	MIN LAT UNDERCLEAR RT REF- NOT H/RR	0.0 M
(56)	MIN LAT UNDERCLEAR LT	0.0 M

********** NAVIGATION DATA **********

(38)	NAVIGATION CONTROL- NO CONTROL	CODE 0
(111)	PIER PROTECTION-	CODE
(39)	NAVIGATION VERTICAL CLEARANCE	0.0 M
(116)	VERT-LIFT BRIDGE NAV MIN VERT CLEAR	M
(40)	NAVIGATION HORIZONTAL CLEARANCE	0.0 M

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SUFFICIENCY RATING =	38.3
STATUS	STRUCTURALLY DEFICIENT
HEALTH INDEX	71.1
PAINT CONDITION INDEX =	65.9

********** CLASSIFICATION ********** CODE

(112)	NBIS BRIDGE LENGTH- YES	Y
(104)	HIGHWAY SYSTEM- NOT ON NHS	0
(26)	FUNCTIONAL CLASS- MINOR ARTERIAL RURAL	06
(100)	DEFENSE HIGHWAY- NOT STRAHNET	0
(101)	PARALLEL STRUCTURE- NONE EXISTS	N
(102)	DIRECTION OF TRAFFIC- 2 WAY	2
(103)	TEMPORARY STRUCTURE-	0
(105)	FED.LANDS HWY- NOT APPLICABLE	0
(110)	DESIGNATED NATIONAL NETWORK - NOT ON NET	0
(20)	TOLL- ON FREE ROAD	3
(21)	MAINTAIN- STATE HIGHWAY AGENCY	01
(22)	OWNER- STATE HIGHWAY AGENCY	01
(37)	HISTORICAL SIGNIFICANCE- NOT ELIGIBLE	5

********** CONDITION ********** CODE

(58)	DECK	6
(59)	SUPERSTRUCTURE	4
(60)	SUBSTRUCTURE	7
(61)	CHANNEL & CHANNEL PROTECTION	7
(62)	CULVERTS	N

********* LOAD RATING AND POSTING ********* CODE

(31)	DESIGN LOAD- MS-13.5 OR HS-15	3
(63)	OPERATING RATING METHOD- ALLOWABLE STRESS	2
(64)	OPERATING RATING-	36.0
(65)	INVENTORY RATING METHOD- ALLOWABLE STRESS	2
(66)	INVENTORY RATING-	21.7
(70)	BRIDGE POSTING- EQUAL TO OR ABOVE LEGAL LOADS	5
(41)	STRUCTURE OPEN, POSTED OR CLOSED-	A
	DESCRIPTION- OPEN, NO RESTRICTION	

********** APPRAISAL ********** CODE

(67)	STRUCTURAL EVALUATION	4
(68)	DECK GEOMETRY	2
(69)	UNDERCLEARANCES, VERTICAL & HORIZONTAL	N
(71)	WATER ADEQUACY	8
(72)	APPROACH ROADWAY ALIGNMENT	8
(36)	TRAFFIC SAFETY FEATURES	0000
(113)	SCOUR CRITICAL BRIDGES	U

********** PROPOSED IMPROVEMENTS **********

(75)	TYPE OF WORK- REPLACE FOR DEFICIENC	CODE 31
(76)	LENGTH OF STRUCTURE IMPROVEMENT	46.3 M
(94)	BRIDGE IMPROVEMENT COST	$943,000
(95)	ROADWAY IMPROVEMENT COST	$188,600
(96)	TOTAL PROJECT COST	$1,584,240
(97)	YEAR OF IMPROVEMENT COST ESTIMATE	2010
(114)	FUTURE ADT	4606
(115)	YEAR OF FUTURE ADT	2036

********** INSPECTIONS **********

(90)	INSPECTION DATE 05/14	(91) FREQUENCY	24 MO	
(92)	CRITICAL FEATURE INSPECTION:		(93) CFI DATE	
	A) FRACTURE CRIT DETAIL-	YES	24 MO	A) 10/13
	B) UNDERWATER INSP-	NO	MO	B)
	C) OTHER SPECIAL INSP-	NO	MO	C)